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# A Perspective View

aaaa. To the great Frame, the ends of which under the Pine Apples are to be contracted to the place of the little Frame, so that the Cross piece at III may support y<sup>e</sup> 3 bearings now shown in the little one, for a better view only.

bb. The little frame on n. the Cap Brasses are, n. receive the turn'd T Gudgeons in the 3 Horizontal Shafts.

cc. The Strong Supporters by the loose Wallowers.

dd. The loose Wallower, whose turn'd rounds gear truly with y<sup>e</sup> Coggs in y<sup>e</sup> great Wheel.

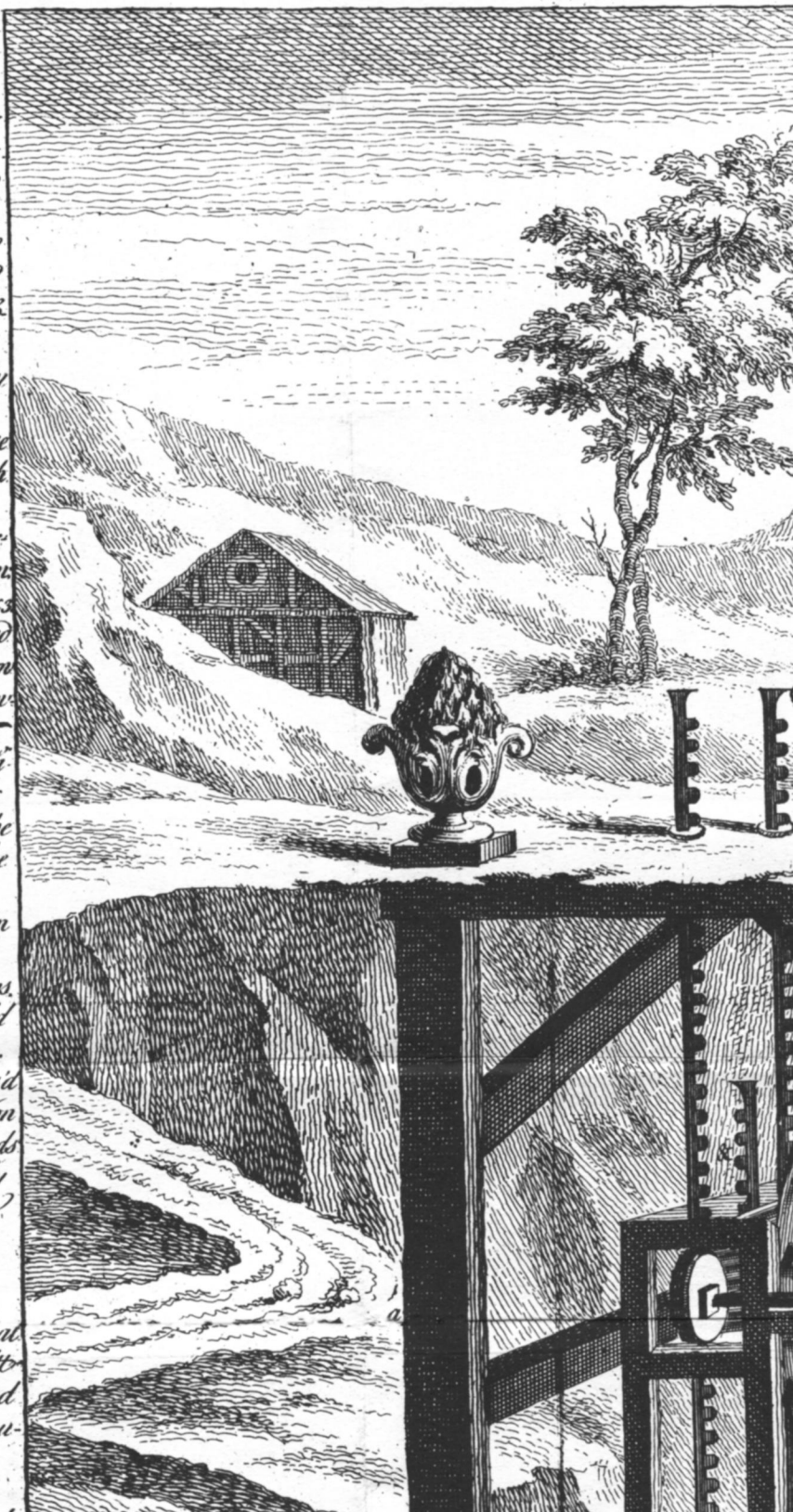
eee. The Regulator, n. has a Circular, direct, and retrograde Motion, see this in the Margins at Fig. 283.

ff. The Strong Shoulder or Stud fixed to the Shaft close by y<sup>e</sup> Wallower, which stops this loose Wallower, when y<sup>e</sup> end of y<sup>e</sup> regulator comes against it, thereby confining it for 2 Revolutions, after which it quits this Stud, & does the same on the opposite side of the Wheel, & so on Alternately, to reverse y<sup>e</sup> Motion of the Stems in the different Cylinders.

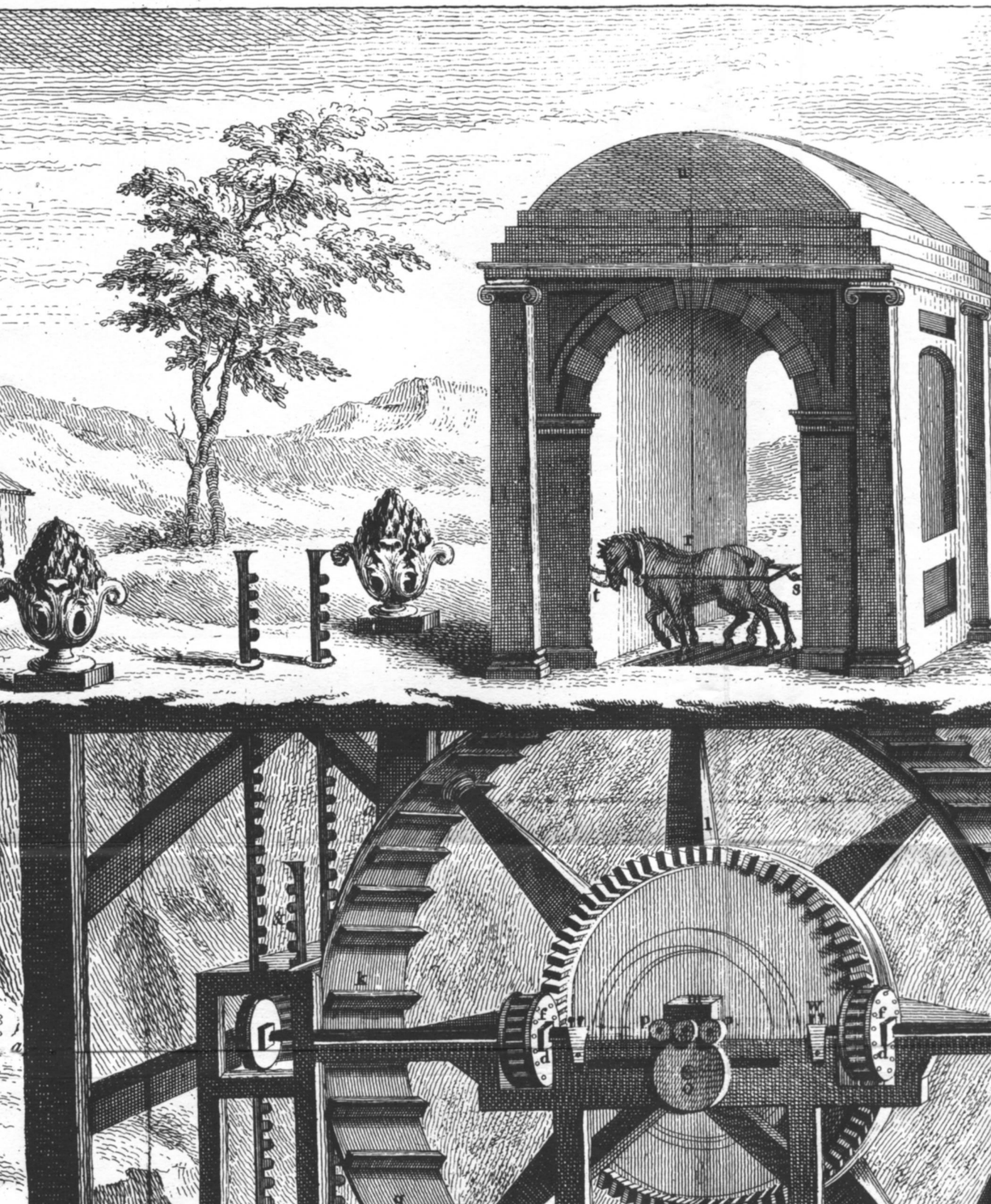
gg. The Wheels, with their Coggs, which Alternately work y<sup>e</sup> fix'd Wallower lying between them.

h. The fix'd Wallower suppos'd to be of four Feet in Diameter on a very short Shaft whose rounds must be of Cast-Iron, & truly turn'd, to elevate & depress the Racks to y<sup>e</sup> Height of 24 Feet by its 2 Revolutions.

iii. The 4 lifters or forcers, behind each of n. must be a small leverage back Wheel, truly fitted to direct the same to rise and fall easily & exactly perpendicular, to avoid friction & Loss of Water in y<sup>e</sup> Cylinders.

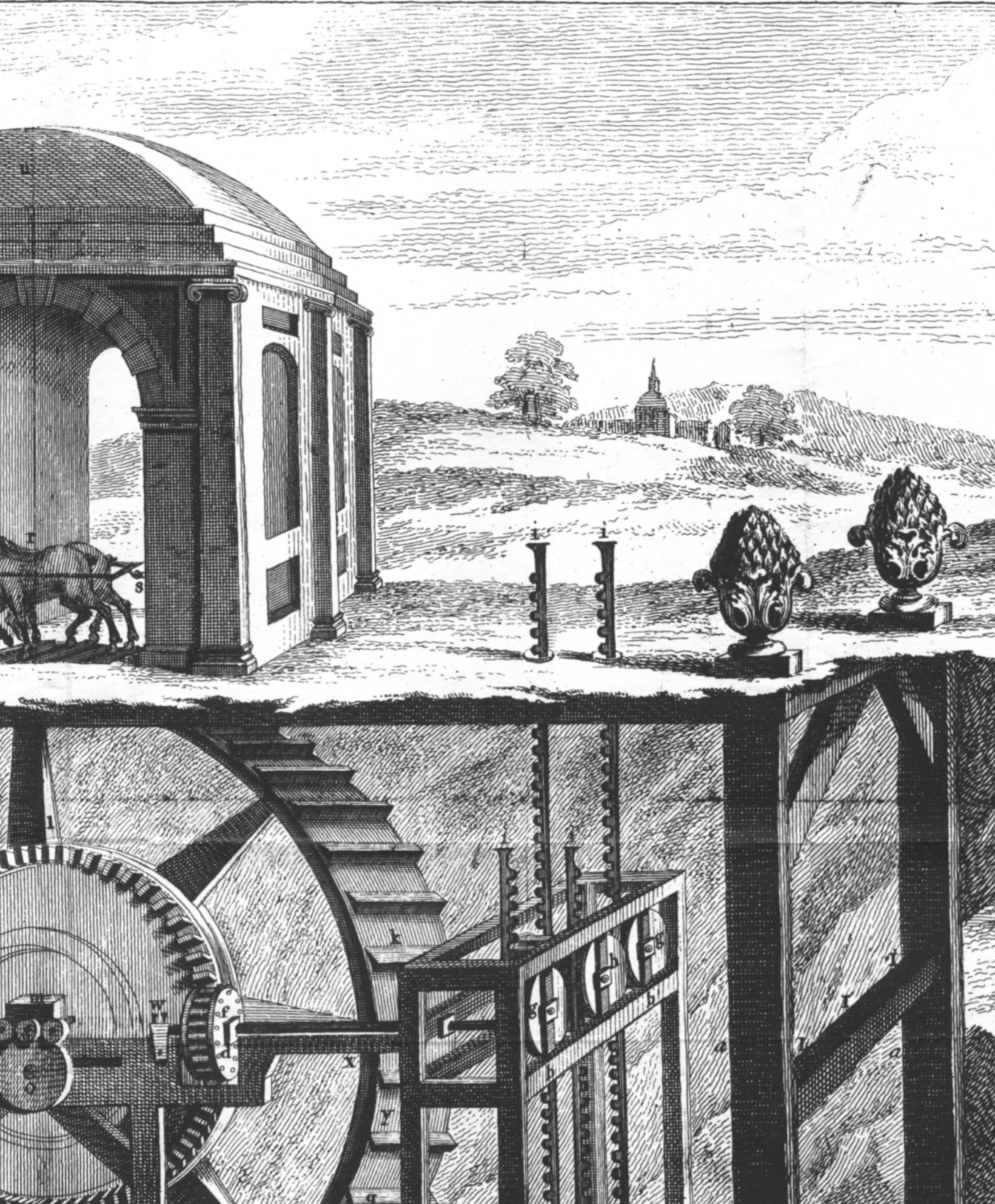


## This engraving depicts a sophisticated mechanical system for lifting water, likely a screw-driven water-lift. The upper portion of the image shows a horse harnessed to a horizontal beam, which is part of a larger mechanism. This beam is connected to a large, vertical screw or worm gear. The horse is standing in front of a building with a prominent dome and arched openings. To the left of the building, there is a small tree and a decorative urn. The lower portion of the image provides a detailed view of the internal mechanical components, including a large water wheel with multiple spokes, a series of gears, and a complex arrangement of levers and pulleys. The entire system is designed to harness the power of a horse to operate a water-lifting mechanism.

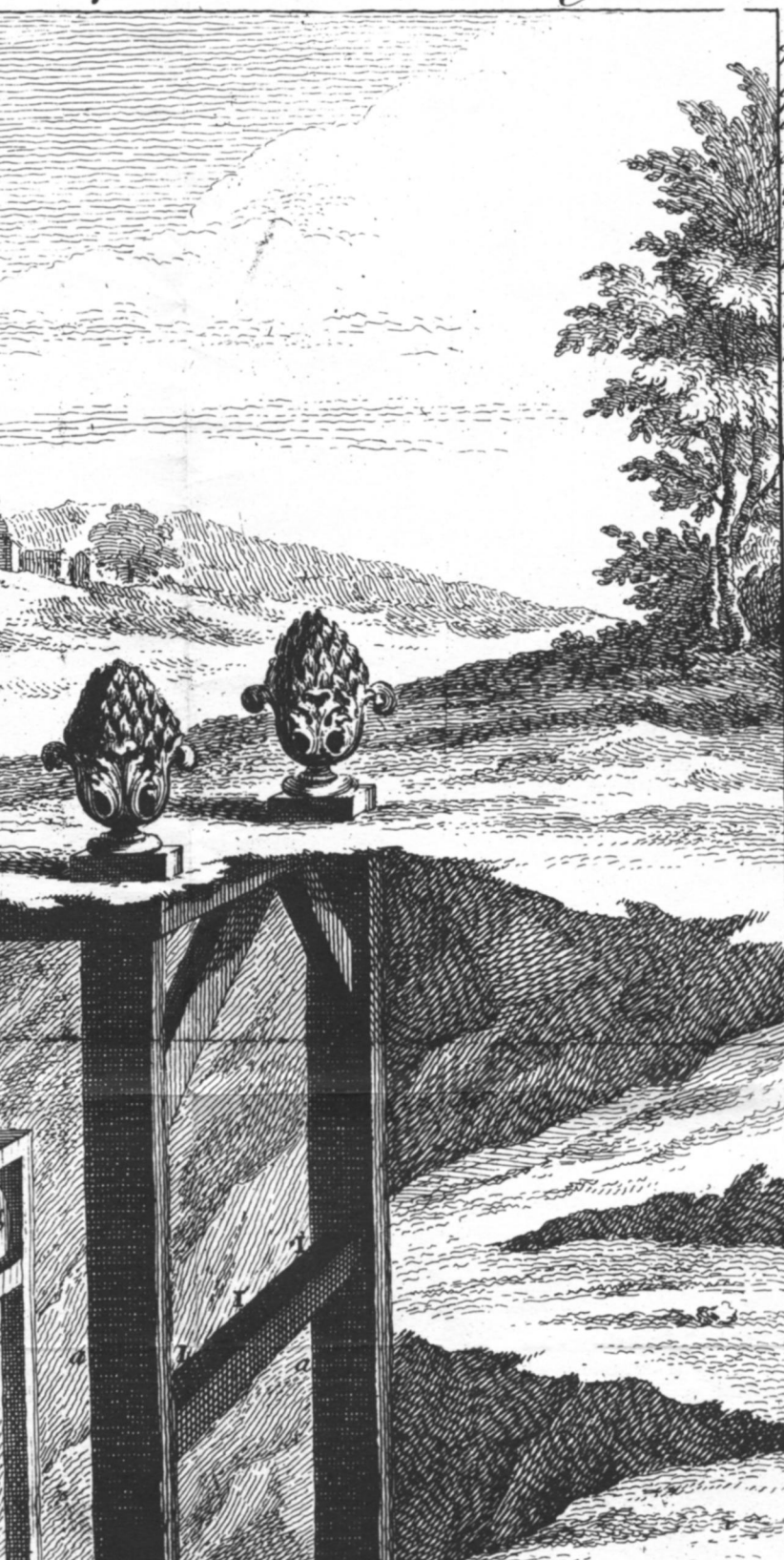




# *CHURCHMAN'S ENGINE for raising*



# NE for raising Water.



pp. Two small side Leverage —  
 Wheels exactly fitted to y<sup>e</sup> 2<sup>nd</sup> part  
 of y<sup>e</sup> great Gudgeon, between y<sup>e</sup> Collar  
 & Shoulder: they are to be so plac'd  
 & key'd, that their friction from y<sup>e</sup>  
 Gudgeon may be alike when at Work.  
 qq. The Steps which the Horses feet  
 press, about 8 or 9 Inches broad, 2  
 Inches thick behind, & declining to  
 an edge, being design'd to make  
 level ground & good footing for their  
 hinder Leggs when they Draw.  
 rr. 4 Horses only in view to avoid  
 Confusion, all drawing Horizon-  
 tally in a straight line, & at right  
 Angles, whereby these useful Ani-  
 mals will soon be taught a new &  
 pleasant way of working to them-  
 selves, a more advantageous one  
 to their Masters, & of greater Utility  
 to y<sup>e</sup> Publick. See my observations on  
 y<sup>e</sup> advantages of this Engine above  
 others in y<sup>e</sup> Philos. Transac. N.º 434  
 s. The fastening places behind y<sup>e</sup>  
 Horses, Suppos'd to be strong arms  
 below in y<sup>e</sup> supporter, & across bar  
 above, at both of w<sup>ch</sup> you may place  
 small sheeves or Rollers, y<sup>e</sup> upper  
 part of them to be level with each  
 Horses breast (when drawing) & the  
 Rope or Strap to come over y<sup>e</sup> same,  
 in order to keep a weight suspende'd  
 of 2500 more or less one or two Inch-  
 es from a Plank. By this Method  
 you will be exactly inform'd of y<sup>e</sup>  
 Strength of each Horse, how long  
 it continues, & when to relieve him,  
 as Also when justly to correct y<sup>e</sup>  
 slothfull one, whose weight rest-  
 ing on y<sup>e</sup> Plank will always dis-  
 cover his Laziness.

t. The fastening places before be-  
 ing design'd to direct their heads.  
 u. The Dome merely for Ornament  
 in y<sup>e</sup> place of w<sup>ch</sup> erect a Workloft,  
 over y<sup>e</sup> a horizontal Windmill, on  
 y<sup>e</sup> lower end of its upright Shaft.



er, which Stops this loose Wallower  
er, when y<sup>e</sup> end of y<sup>e</sup> regulator  
comes against it, thereby confi-  
ning it for 2 Revolutions, after  
which it quits this Stud, & does the  
same on the opposite side of the  
Wheel, & so on Alternately, to  
reverse y<sup>e</sup> Motion of the Stems in  
the different Cylinders.

g. The Wheels, with their Coggs,  
which Alternately work y<sup>e</sup> fix'd  
Wallower lying between them.

h. The fix'd Wallower suppos'd  
to be, of four Feet in Diameter on  
a very short Shaft whose rounds  
must be of Cast soft Iron, & truly  
turn'd, to elevate & depress the  
Racks to y<sup>e</sup> Height of 24 Feet  
by its 2 Revolutions.

iii. The 4 lifters or forcers,  
behind each of n. must be a small  
Leverage back Wheel, truly fitter'd  
to direct the same to rise and  
fall easily & exactly perpendicu-  
lar, to avoid friction & Loss of  
Water in y<sup>e</sup> Cylinders.

k. The large vertical Wheel;  
a small Segment of which comes  
through y<sup>e</sup> Floor in y<sup>e</sup> Dome for  
y<sup>e</sup> 4 Horses to stand & Draw on.

l. The arms, & y<sup>e</sup> main Shaft  
of the same.

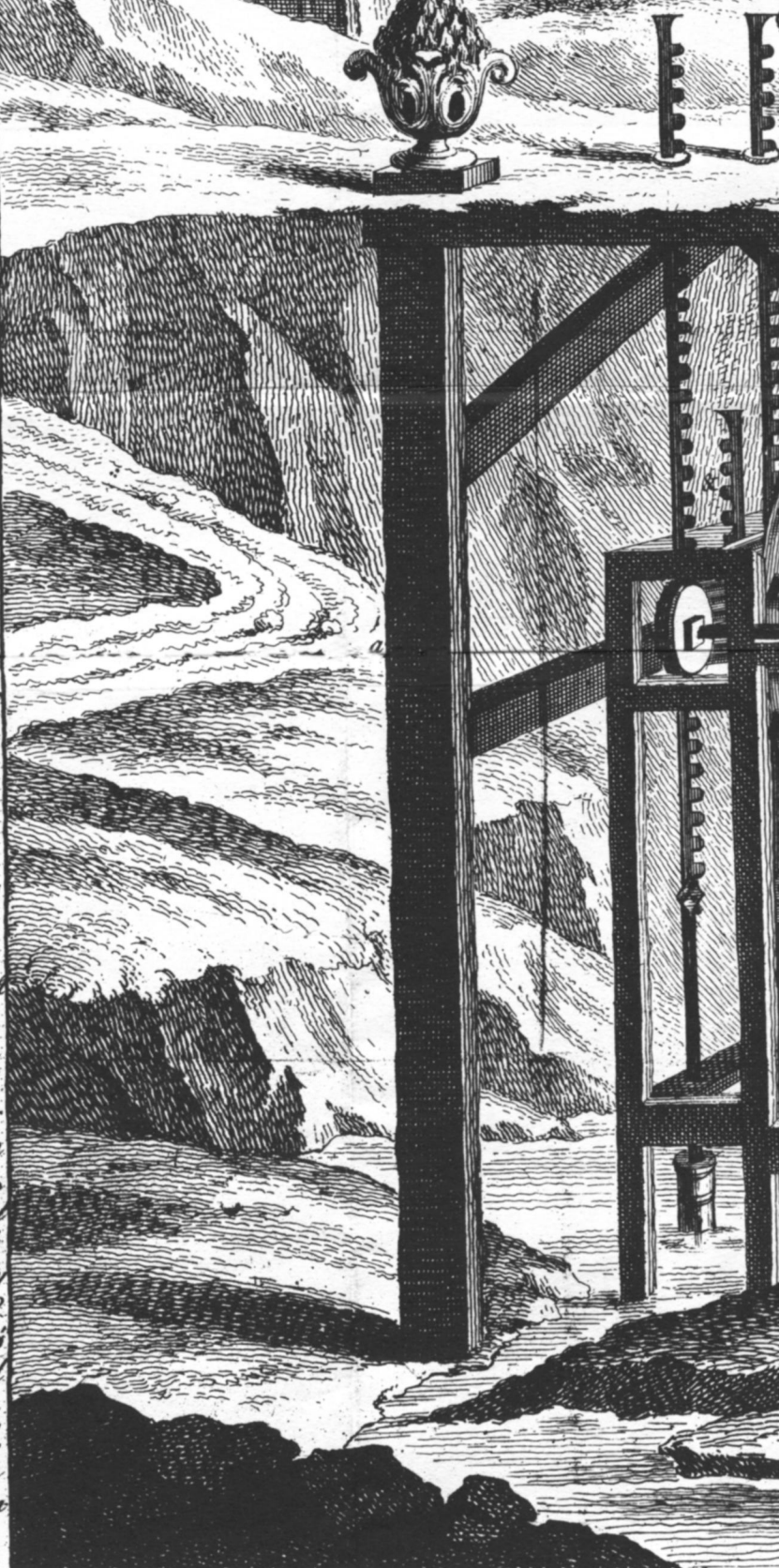
n. The turn'd T Gudgeon, with  
its Collar & Shoulder, both of n.  
must Clasp y<sup>e</sup> rim of the under  
Leverage Wheel, to keep all firm  
& Steady when in working.

o. The leverage wheel of about  
4 feet in Diameter, with a Brass  
or Iron rim suppos'd to be truly  
turn'd, and to have a strong  
short Iron spindle through its  
Center, & at each end, a turn'd Steel  
Collar & Shoulder bearing on  
2 Cast Cap Brasses exactly level,  
is sunk into a strong Arch piece  
of Timber well braced and Sup-  
ported for this purpose.\*



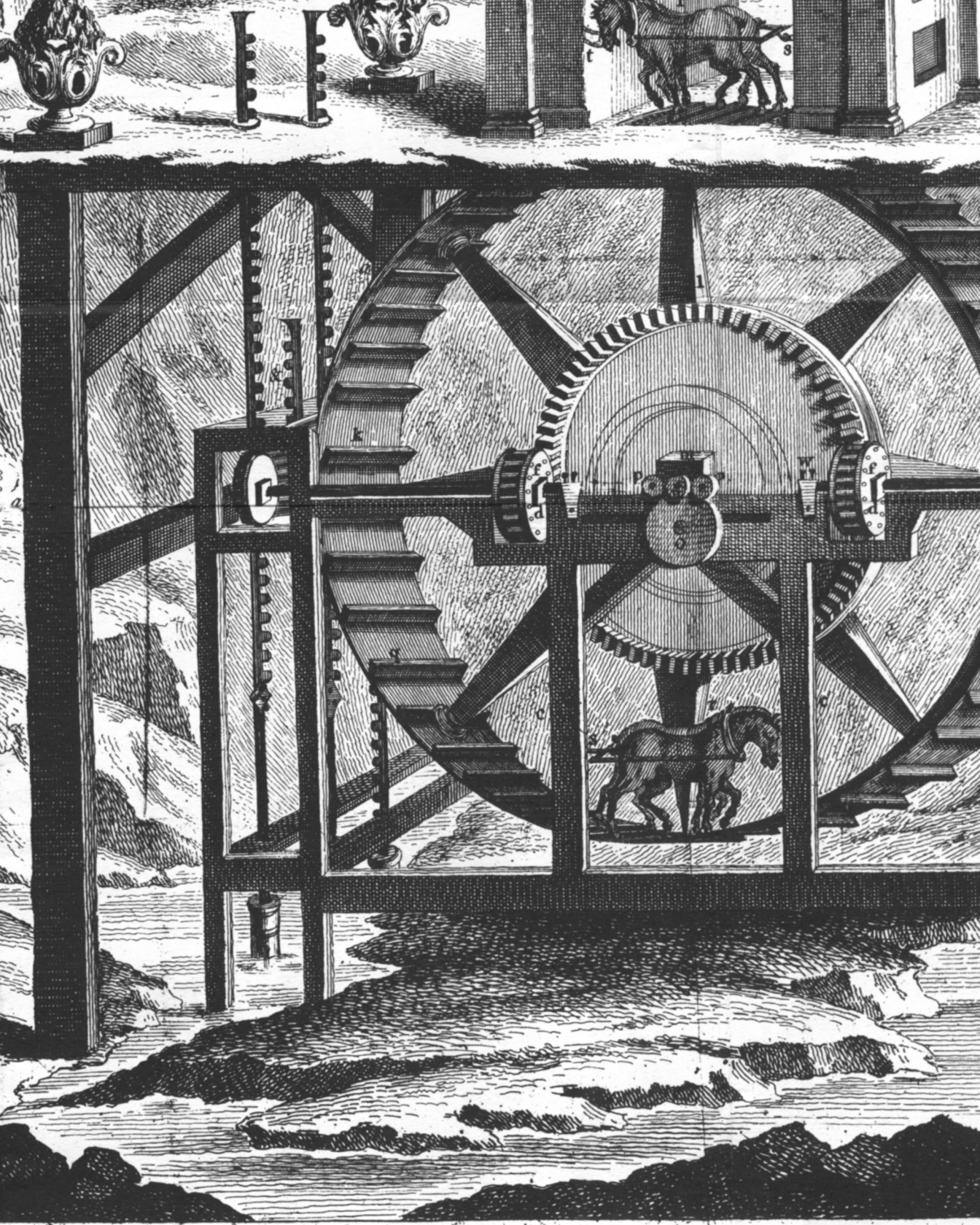
The Arms lie horizontal, and the  
oval part is perpendicular.

\* In large Engines & Machines where the motion is regular every heavy bearing should have one of these



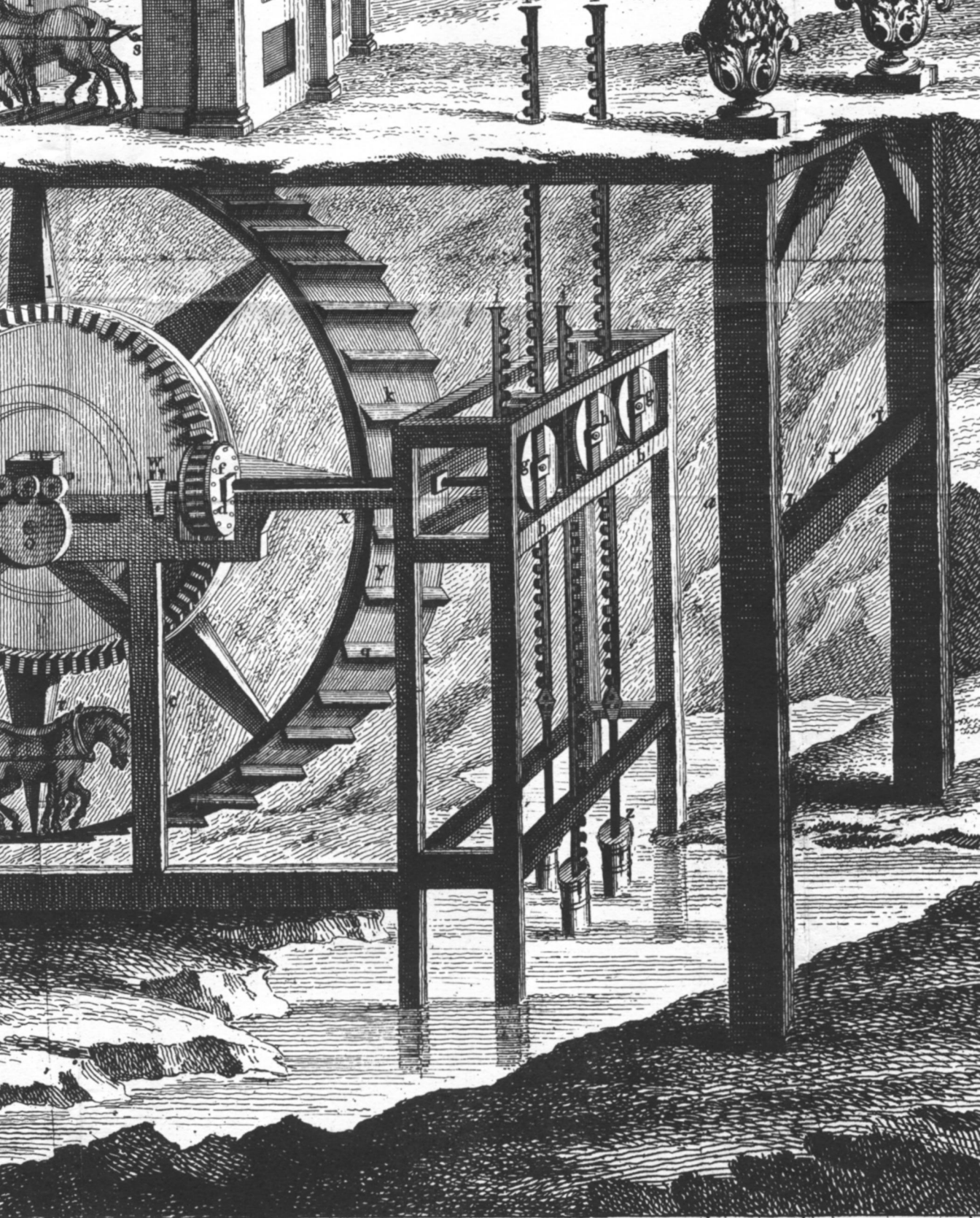
N.B. A single Shaft with the loose and fix'd Wallower  
lifting or forcing, at either of its ends, or at both together  
purposes Vid. Fig. 2 in the Margin.

The Pin



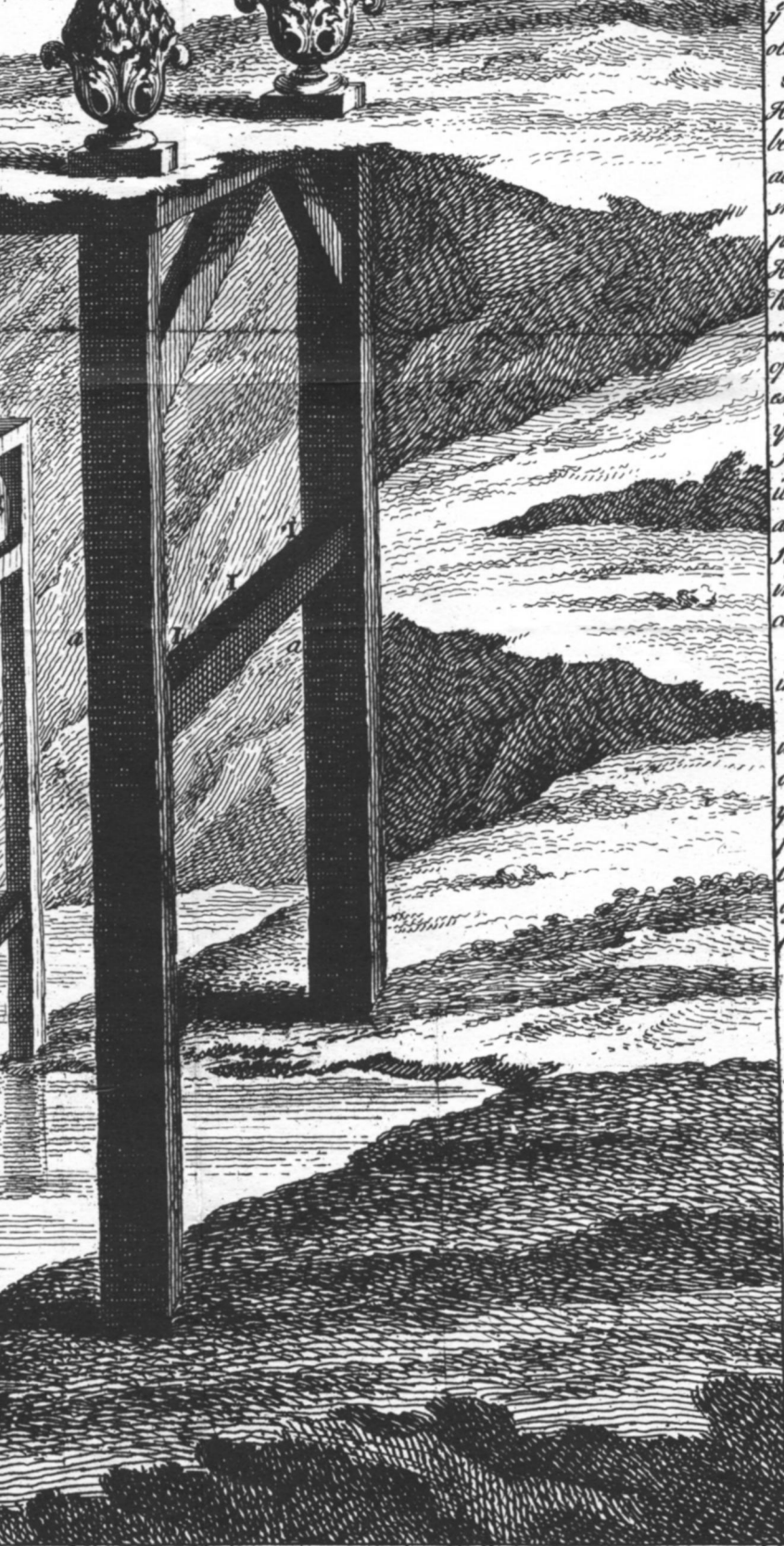
with the loose and fix'd Wallovers, will be of great simplicity and advantage to the Publick, as  
 her of its ends, or at both together: but chiefly, as it is easily adapted to the different sorts of Win  
 the Margin. The Pins 3.4. & the arms 55, which clasp the brages 6.6. with the oval figure 7 &  
 heavy bearing should have one of these Wheels for, they save Power by greatly abating Friction. Upon the Principle of these





and advantage to the Publick, as being erected for less expence, and as it will work pleasantly  
 to the different sorts of Windmills, Waterwheels, &c. of all denominations already in use.  
 The brabes 6.6. with the oval figure 7 & its 2 teeth make this Regulator, which is work'd by the Stud in the main  
 wheeling Friction. Upon the Principle of these Leverage-Wheels Captain Howe has publish'd what he calls his Friction Wheels the





and as it will work pleasantly any number of Racks for  
denominations already in use. It also serves for small  
work which is work'd by the Stud in the main Shaft  
publish'd what he calls his Friction Wheels the subsequent to my Specification thereof.

of advantages of this Engine above  
others in y<sup>e</sup> Philos. Transac. N<sup>o</sup>. 434  
s. The fastening places behind y<sup>e</sup>  
Horses, Suppos'd to be strong arms  
below in y<sup>e</sup> Supporter, & above bar  
above, at both of w<sup>h</sup> you may place  
small sheeves or Rollers, y<sup>e</sup> upper  
part of them to be level with each  
Horses breast (when drawing) & the  
Rope or Strap to come over y<sup>e</sup> same,  
in order to keep a weight suspended  
of L. 300 more or less one or two Inch-  
es from a Plank. By this Method  
you will be exactly inform'd of y<sup>e</sup>  
Strength of each Horse, how long  
it continues, & when to relieve him,  
as Also when justly to correct y<sup>e</sup>  
Slothfull one, whose weight rest-  
ing on y<sup>e</sup> Plank will always dis-  
cover his Laziness.

t. The fastening places before be-  
ing design'd to direct their heads.

u. The Dome merely for Ornament  
in y<sup>e</sup> place of n<sup>o</sup>. erect a W<sup>h</sup> or hloft,  
over y<sup>e</sup> a horizontal W<sup>h</sup>ind mill; on  
y<sup>e</sup> lower end of its upright Shaft,  
fix a Spur Wheel to work with the  
Gogs of y<sup>e</sup> great W<sup>h</sup>eel, thereby to  
assist y<sup>e</sup> Horses, or n<sup>o</sup>. there's a sufficient  
force of W<sup>h</sup>ind to do their whole Duty.

w. The Coupling Staples with  
their Brackets.

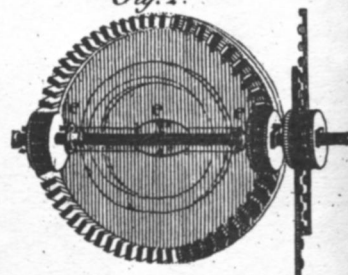
x. The Strong Catch n<sup>o</sup>. confines  
y<sup>e</sup> great W<sup>h</sup>eel to the Frame.

y. The Screw or Key-band to  
confine all close & tight.

z. The Cylinders n<sup>o</sup>. are screw'd  
together at their ends out of sight

& All y<sup>e</sup> same sort of Work chief-  
ly for Uniformity in y<sup>e</sup> Draught.

Fig. 2.



These Prints may be had at my  
Chocolate-Warehouses  
in St. Pauls-Church y<sup>e</sup> London  
and in Broad-Mead Bridge

dem in frustra confractum & auctionis lege venditum fuit, ita ut permulti eorum, qui adhuc in vivis sunt, hujus rei oculati testes esse possint, & per consequens nemo de hac circumstantia, quod satis magna frustra Ambrae reperiantur, dubitare debeat; hac occasione semel adhuc quaero, qua ratione Americani Domini referentes cum sua cystide hic convenient, si de tam ingentibus Ambrae gryseae frustis auditu vel lectu quicquam percipiunt?

*Continuabitur hæc Dissertatio in N° seq.*

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II. *An Account of a new Engine for raising Water, in which Horses or other Animals draw without any loss of Power (which has never yet been practised) and how the Strokes of the Pistons may be made of any Length, to prevent the loss of Water, by the too frequent opening of Valves; with many other Advantages altogether new; the Model of which was shewn to the Royal Society on the 28th of November, by Walter Churchman, the Inventor of it.*

*The Description of this Engine is given on the Sides of the Plate, where the Engine itself is likewise delineated. Vide TAB.*

**T**HE Animals all draw horizontally, and in a streight Line, and at right Angles, whereby they exert their utmost Force. — By these Advantages

tages a far greater Power is gain'd from the Strength of Horses, &c. than by their going round in a Circle; for by the Twist and Acuteness of the Angles, they draw in towards the Centre, whereby they waste their Power, and also shorten their Levers: Besides, their Muscles and Tendons from their hinder Legs all along their Sides to their Necks are unequally strain'd, as the Duty is hardest on one Side, even tho' their Walk is large. Therefore each of those Inconveniencies must be attended with Pain to the Animals when at Work, and a great Loss of their Strength.

2<sup>dly</sup>, A Crank does not rise quite one third of its Circle, neither do the Regulators or Rods rise or fall perpendicular, but obliquely, by which an oval Figure is made by the Piston's Motion in every Cylinder, which occasions great Friction and a loss of Water, and every Arm of it is continually varying in its Power whilst working, as its Lever is distant from the perpendicular Line, and two of the Arms (supposing it a quadruple one) as they cross the Perpendicular are always drawing to, and from their own Centre, by which the Power is not only lost, but the Time also; and farther yet, by the shortness of the Strokes, all the adjacent Water is frequently contrarily moved, and by the often opening and shutting of the Valves, there is also a great Waste of the Water, besides the many heavy Bearings, Frictions, Surges, and Repairs belonging to it; all which Inconveniencies and Impediment being thoroughly considered, there must certainly be required a much greater Power to work the same than by my Method. For, hereby, a

H h h

Stroke



Stroke of 24 Feet will rise, and by enlarging or diminishing the fix'd Wallower, you obtain a Stroke of any required Height, even to the extent of the Atmosphere's Pressure. By this great Advantage, the Water rises freer, and with greater Velocity, and as the Lifters or Forcers rise and fall exactly perpendicular, and with an equal continued Strain, and as the Bearings also are fewer and lighter, consequently the Friction in all these will be a great deal less than with the Crank, &c. And, Lastly, Seven Eights of that Water which is always lost by the slow opening and shutting of the Valves will be saved.

From the above Considerations, and by the many Experiments I have made on this Occasion, in order to know the real Difference between these different ways of Working, I find, that near twice the Quantity of Water will be raised to the same Height, in the same Time, with the same Power, by my Method, more than with the best Crank-work that has ever been yet erected.